SPECTROSCOPIA MOLECULAR

Un bulletin mensual de novas e informationes de interesse e valor al spectroscopistas molecular

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LE SPECTRO INFRARUBIE DE $S^{16}O^{18}O$ E LE CONSTANTES DE FORTIA DE SO_2

(Summario de un articulo submittite al J. Chem. Phys. le 11 de decembre 1953.)

UN investigation del spectro infrarubie de $S^{16}O^{18}O$ resultava in le sequente assignation:

σ_1	σ_2	σ_3
1122 ± 1	506,8 ± 0,5	1341 ± 0,5 K.

Iste datos insimul con le números de undas fundamental de $S^{16}O_2$ ha essite usate pro calcular le constantes de energia potential del dioxydo de sulfure. Isto es:

f_d	f_{dd}	f_{dd}/d	f_α/d^2
10,02	0,03	0,20	0,793

SANTIAGO R. POLO
M. KENT WILSON

Universitate Harvard
Cambridge, Massachusetts

LE CONSTANTES ROTATIONAL DE SiH_3D

(Summario de un articulo submittite al J. Chem. Phys. in februario 1954.)

LE analyse del structura rotational del fundamental de tension Si-D dava le sequente valores:

B"	B" - B'	σ_o
2,11 ± 0,01	0,019	1594,4 ± 0,1 K.

Le valor del distantia Si-H obtenite sub le supposition que illo remane incambiate per le substitution isotope es

$$d_{Si-H} = 1,477 \pm 0,003 \text{ A.}$$

SANTIAGO R. POLO
M. KENT WILSON

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Cambridge, Massachusetts

DATOS SPECTRAL RAMAN E INFRARUBIE E ASSIGNATIONES TENTATIVE PRO DIIODOETHYLENO CIS E TRANS

(Summario de un articulo submittite al J. Chem. Phys. le 7 de april 1954.)

DISPLACIAMENTOS Raman, intensitates relative, e factores de dispolarisation como etiam numeros de undas e intensitates relative del bandas de absorption infrarubie in le region 400 - 4000 K ha essite obtenite. Le fundamentales es:

	cis IHC=CHI		trans IHC=CHI	
σ_1	3030	a_1	3026	a_g
σ_2	1545	a_1	1537	a_g
σ_3	1120	a_1	1225	a_g
σ_4	495	a_1	663	a_g

(continuate a pagina 33)

LE secunde responsibilitate del universitates -- le avantiamento del saper per recerca -- deberea haber venite primo in ordine de importantia, proque il es un spirito de inquesta e recerca que es requirite pro contravenir le mortification del inseniamento ex manuales scholar. Il es le homine qui ille mesme pulse le confinios del saper in avante per su recerca qui es qualificate a presentar su disciplina como un cosa vivente e crescente e a facer su studentes sentir lo como tal.

-- D. R. PYE.

TRACTAMENTOS DEL COORDINATAS NORMAL DE MOLECULAS POLYATOMIC

Salvador M. Ferigle e Alfons Weber
Instituto Technologic de Illinois, Chicago 16, Illinois
(continuate ab Spec.Mol. 3, 27 (1954))

3.323 Torsion de Ligamine. In un maniera analoge al qual usate pro obtener Eq. 41, nos vide que

$$\underline{s}(\tau_{jk}^{il};i) = -\underline{h}_{ijk}^{\ l}\, Q_{ij} \operatorname{cosec} \phi_{ik}^{\ j} \quad (44)$$

e

$$\underline{s}(\tau_{jk}^{il};l) = -\underline{h}_{ljk}^{\ i}\, Q_{kl} \operatorname{cosec} \phi_{jl}^{\ k}. \quad (45)$$

Nos nunc usa Eq. 38, con le puncto de origine al atomo k, insimul con Eqs. 44 e 45 pro obtener

$$\underline{e}_{kj} \times \underline{s}\tau^{j}/Q_{kj} - \underline{e}_{kl} \times \underline{h}_{lkj}^{\ i} \operatorname{cosec} \phi_{jl}^{\ k} - Q_{ij} \operatorname{cosec} \phi_{ik}^{\ j} (\underline{e}_{kj}/Q_{kj} + \underline{e}_{ji}/Q_{ji}) \times \underline{h}_{ijk}^{\ l} = 0.$$

Transponente le ultime tres terminos al dextera e cruciante $\underline{e}_{kj}$ de ambe lateres, nos obtene

$$(\underline{e}_{kj} \cdot \underline{s}\tau^{j})\, \underline{e}_{kj} - \underline{s}\tau^{j} = Q_{kj} \operatorname{cosec} \phi_{jl}^{\ k} (\underline{e}_{kj} \times \underline{f}_{lj}^{\ k}) + Q_{ij} \operatorname{cosec} \phi_{ik}^{\ j} (\underline{e}_{kj} \times \underline{f}_{ki}^{\ j}) + Q_{kj} \operatorname{cosec} \phi_{ik}^{\ j} (\underline{e}_{kj} \times \underline{f}_{ik}^{\ j}).$$

Proque $\underline{s}\tau^{j}$ es le gradiente de T, illo debe esser normal a $\underline{e}_{kj}$ ($\underline{e}_{kj}$ es le direction de τ zero pro un displaciamento $\underline{d}_j$ del atomo j) e ergo

$$\underline{s}\tau^{j} = Q_{kj} \cot \phi_{jl}^{\ k}\, \underline{h}_{lkj}^{\ i} + Q_{ij} \operatorname{cosec} \phi_{ik}^{\ j}\, \underline{h}_{ijk}^{\ l} - Q_{kj} \cot \phi_{ik}^{\ j}\, \underline{h}_{ijk}^{\ l}.$$

Ben que iste equation es un perfectemente valide representation pro $\underline{s}$, nos pote usar le sequente equation vectorial pro obtener un forma plus recognoscibile pro iste vector $\underline{s}$. Proque

$$\underline{h}_{lkj}^{\ i} = -\cos T_{jk}^{\ il}\, \underline{h}_{ijk}^{\ l} + \sin T_{jk}^{\ il}\, \underline{f}_{ki}^{\ j},$$

tunc

$$\underline{s}(\tau_{jk}^{il};j) = \underline{h}_{ijk}^{\ l}(Q_{ij} \operatorname{cosec} \phi_{ik}^{\ j} - Q_{kj} \cot \phi_{ik}^{\ j} - Q_{kj} \cot \phi_{jl}^{\ k} \cos T_{jk}^{\ il}) + Q_{kj}\, \underline{f}_{ki}^{\ j} \cot \phi_{jl}^{\ k} \sin T_{jk}^{\ il}. \quad (46)$$

Proque

$$\underline{h}_{ijk}^{\ l} = \operatorname{cosec} \phi_{ik}^{\ j}\, \underline{e}_{ij} \times \underline{e}_{jk} \quad (47)$$

e

$$\underline{f}_{ki}^{\ j} = -\underline{e}_{jk} \times (\underline{e}_{ij} \times \underline{e}_{jk}) \operatorname{cosec} \phi_{ik}^{\ j}, \quad (48)$$

Eqs. 44-46 es equivalente al forma date per Decius[5].

Similemente

$$\underline{s}(\tau_{jk}^{il};k) = \underline{h}_{jkl}^{\ i}(Q_{kl} \operatorname{cosec} \phi_{jl}^{\ k} - Q_{kj} \cot \phi_{jl}^{\ k} - Q_{kj} \cot \phi_{ik}^{\ j} \cos T_{jk}^{\ il}) + Q_{kj}\, \underline{f}_{jl}^{\ k} \cot \phi_{ik}^{\ j} \sin T_{jk}^{\ il}. \quad (49)$$

3.324 Flexion Extra Le Plano. Il es convenibile proceder per lassar

$$\underline{s}(\gamma_{ijk}^{\ l};l) = Q_{kl}\, \underline{u},$$

ubi $\underline{u}$ es un vector unitari le qual es in le direction de $\underline{s}_j^{\ l}$ e perpendicular al ligamine k-l. Proque γ es zero pro un displaciamento del atomo l que es situate in un cono super un linea perpendicular al plano i-j-k, a transverso del atomo k, le gradiente Γ es perpendicular al superficie de iste cono; assi

$$\underline{u} = a\, \underline{h}_{ijk}^{\ l} + b\, \underline{e}_{kl}.$$

Per facer le producto scalari con $\underline{h}_{ijk}^{\ l}$ e $\underline{e}_{kl}$ al duo lateres de iste equation nos

pote solver pro $\underline{a}$ e $\underline{b}$ e obtener

$$\underline{s}(\gamma_{ijk}^{\ 1};1) = Q_{kl} \sec \Gamma_{ijk}^{\ 1} (\underline{h}_{ijk}^{\ 1} - \sin \Gamma_{ijk}^{\ 1} \underline{e}_{kl}). \quad (50)$$

Usante Eq. 38 e lassante le puncto de origine al atomo k, nos obtene

$$\underline{e}_{ki} \times \underline{s}\gamma^{i}/Q_{ki} + \underline{e}_{kj} \times \underline{s}\gamma^{j}/Q_{kj} + \underline{e}_{kl} \times \underline{s}\gamma^{l}/Q_{kl} = 0.$$

Per facer le producto scalari con $\underline{e}_{kj}$ al duo lateres de iste equation, nos elimina le secunde termino. Tunc per substituer ab Eq. 50 e rearrangiar nos obtene

$$\underline{s}\gamma^{i} \cdot (\underline{e}_{kj} \times \underline{e}_{ki})/Q_{ki} + \underline{h}_{ijk}^{\ 1} \cdot (\underline{e}_{kj} \times \underline{e}_{kl}) \sec \Gamma_{ijk}^{\ 1} = 0,$$

e usante

$$\underline{h}_{ijk}^{\ 1} = -\operatorname{cosec} \phi_{ij}^{\ k}\, \underline{e}_{kj} \times \underline{e}_{ki},$$

nos ha

$$\underline{s}\gamma^{i} \cdot \underline{h}_{ijk}^{\ 1} = Q_{ki} \operatorname{cosec}^2 \phi_{ij}^{\ k} \sec \Gamma_{ijk}^{\ 1} \cdot (\underline{e}_{kj} \times \underline{e}_{kl}) \cdot (\underline{e}_{kj} \times \underline{e}_{ki}).$$

Post uso de un identitate vectorial, isto deveni

$$\underline{s}\gamma^{i} \cdot \underline{h}_{ijk}^{\ 1} = -Q_{ki} \operatorname{cosec}^2 \phi_{ij}^{\ k} \sec \Gamma_{ijk}^{\ 1} \cdot \left[\underline{e}_{kl} \cdot \underline{e}_{ki} - (\underline{e}_{kj} \cdot \underline{e}_{ki})(\underline{e}_{kl} \cdot \underline{e}_{kj})\right] = -Q_{ki} \Psi_{ijl}^{\ k} \operatorname{cosec}^2 \phi_{ij}^{\ k} \sec \Gamma_{ijk}^{\ 1},$$

ubi

$$\Psi_{ijl}^{\ k} = \underline{e}_{kl} \cdot \underline{e}_{ki} - (\underline{e}_{kj} \cdot \underline{e}_{ki})(\underline{e}_{kl} \cdot \underline{e}_{kj}) = \cos \phi_{il}^{\ k} - \cos \phi_{ij}^{\ k} \cos \phi_{jl}^{\ k}.$$

Proque le direction de $\underline{s}\gamma^{i}$ es $\underline{h}_{ijk}^{\ 1}$ nos ha finalmente

$$\underline{s}(\gamma_{ijk}^{\ 1};i) = -Q_{ki} \Psi_{ijl}^{\ k} \operatorname{cosec}^2 \phi_{ij}^{\ k} \cdot \sec \Gamma_{ijk}^{\ 1} \underline{h}_{ijk}^{\ 1}, \quad (51)$$

e per analogia

$$\underline{s}(\gamma_{ijk}^{\ 1};j) = -Q_{kj} \Psi_{jil}^{\ k} \operatorname{cosec}^2 \phi_{ij}^{\ k} \cdot \sec \Gamma_{ijk}^{\ 1} \underline{h}_{ijk}^{\ 1}. \quad (52)$$

Usante Eq. 33, nos obtene

$$\underline{s}(\gamma_{ijk}^{\ 1};k) = \sec \Gamma_{ijk}^{\ 1} \left[Q_{kl} \sin \Gamma_{ijk}^{\ 1} \underline{e}_{kl} - (Q_{kl} \sin^2 \phi_{ij}^{\ k} - Q_{ik} \Psi_{ijl}^{\ k} - Q_{jk} \Psi_{jil}^{\ k}) \underline{h}_{ijk}^{\ 1} \operatorname{cosec}^2 \phi_{ij}^{\ k}\right]. \quad (53)$$

Eqs. 50-53 es equivalente a illos date per Lohman[6] pro le coordinatas de flexion extra le plano.

(Va continuar in un numero futur)

DIIODOETHYLENO (continuate ab pagina 31)

σ_5	85	a_1	154	a_g
σ_6	337	a_2	907	a_u
σ_7	176	a_2	73*	a_u
σ_8	3023	b_1	592	b_g
σ_9	1219	b_1	3069	b_u
σ_{10}	672	b_1	1128	b_u
σ_{11}	400	b_1	588	b_u
σ_{12}	645	b_2	214*	b_u

Illos designate per * esseva obtenite ex combinationes e harmonicos.

SIDNEY I. MILIER
AIFONS WEBER
FORREST F. CLEVELAND

Instituto Technologic de Illinois
Chicago 16, Illinois

METHANOS SUBSTITUITE. XXI. NUMEROS DE UNDAS CALCULATE E PROPRIETATES THERMODYNAMIC PRO CH_2DBr E CHD_2Br

(Summario de un articulo submittite al J. Chem. Phys. le 6 de April 1954.)

USANTE constantes de energia potential del moleculas CH_3Br e CD_3Br, le numeros de undas fundamental pro CH_2DBr e CHD_2Br esseva calculate per le methodo Wilson con un function de energia potential continente omne terminos possibile del secunde grado. Le valores assi obtenite es:

	Typo	CH_2DBr	CHD_2Br
σ_1	a'	3008	3046 K
σ_2	a'	2222	2168
σ_3	a'	1458	1299
σ_4	a'	1223	1057
σ_5	a'	760	690
σ_6	a'	596	576
σ_7	a"	3081	2279
σ_8	a"	1276	1302
σ_9	a"	929	727

Nulle valores experimental ha essite obtenite pro iste moleculas, sed il es credite que iste valores es valide intra duo per cento.

Valores calculate del contento caloric, energia libere, entropia, e capacitate caloric in calorias grado^{-1} mole^{-1} es:

CH_2DBr

T(°K)	H/T	-F/T	S°	C_p°
100	7,95	43,97	51,92	7,98
200	8,13	49,52	57,65	8,87
273,16	8,49	52,10	60,60	10,14
298,16	8,65	52,85	61,51	10,61
300	8,66	52,91	61,57	10,65
400	9,40	55,49	64,89	12,53
500	10,20	57,68	67,87	14,21
600	10,99	59,61	70,60	15,66
700	11,75	61,36	73,11	16,89
800	12,46	62,97	75,43	17,96
900	13,12	64,48	77,61	18,87
1000	13,74	65,90	79,63	19,67

CHD_2Br

100	7,95	44,38	52,33	8,00
200	8,22	49,94	58,16	9,23
273,16	8,69	52,57	61,26	10,75
298,16	8,88	53,34	62,22	11,28
300	8,90	53,39	62,29	11,32
400	9,76	56,07	65,83	13,32
500	10,65	58,34	68,99	15,03
600	11,50	60,36	71,86	16,48
700	12,30	62,19	74,49	17,71
800	13,05	63,88	76,93	18,76
900	13,73	65,46	79,19	19,65
1000	14,36	66,94	81,30	20,40

JEROME M. DOWLING.

Instituto Technologic de Illinois
Chicago 16, Illinois, Statos Unite

SPECTROSCOPIA MOLECULAR IN ITALIA

Prof. G. B. Bonino, Chef del Instituto Chemic "G. Ciamician", Laboratorio de Spectrographia, Universitate Bologna, Via Selmi, 2, Italia, ha offerite su assistentia como representante de iste periodico in le region italian. Iste servicio es multo appreciate. Requestas pro information, abonamentos a Spectroscopia Molecular, exemplares del monographia, Regulas de Selection Pro Spectros Vibrational de Moleculas Polyatomic, o pro addition al lista de membros del Societate Del Spectroscopistas Molecular pote esser inviate a professor Bonino a ille adresse.

Iste laboratorio etiam pote servir como un centro pro le collection de novas e informationes pro publication in iste bulletin. Simile centros in altere regiones es desirabile.

SUMMARIOS IN INTERLINGUA

Le redactores del jornales publicate per le American Institute of Physics va considerar a lor sequente convocation le possibilitate de publicar summarios in interlingua con le articulos in ille jornales.

Etiam le redactores e le committee de publication del American Chemical Society va considerar le mesme materia a lor sequente convocation in junio.

Physicos e chimicos pote exprimer lor vistas re iste materia per scriber a Dr. H. A. Barton, American Institute of Physics, 57 East 55th St., New York 22, N.Y. o Dr. Arthur C. Cope, Departimento de Chimia, Instituto Technologic de Massachusetts, Cambridge, Mass.

Le jornal medic Blood publica summarios in interlingua de su articulos jam depost januario 1954.

CONTRIBUTION A SPECTROSCOPIA MOLECULAR

Dr. L. Singh e su collegas e studentes a Christ Church College, Kanpur, India ha contribuite $17.55 al disveloppamento de iste periodico. Prof. Bonino (vide supra) etiam ha recentemente inviate un contribution. Multe gratias a nostre amicos indian e italian.

LIBROS

Linear Operators -- Spectral Theory and Some Other Applications. Per Richard G. Cooke. St. Martin's Press, 103 Park Ave., New York 17; Macmillan and Co., St. Martin's Street, London. 1953. 454 paginas, precio $10.00.

Topicos considerate es operatores in spatio Hilbert, theoria de resolution spectral, e le connexion de istos con le mechanicas de quantos; spatios de matrice, e anulos e algebras Banach.

Le consideration del operatores linear seque in un maniera natural ex un studio de matrices infinite, le quales forma un importante caso particular quando le matrices es associative.

Structures of Organic Compounds. Redigite per E. A. Braude e F. C. Nachod. Academic Press, Inc., 125 East 23rd Street, New York 10, N. Y. Autumno 1954.

Iste libro va tractar le plus importante methodos physic de determinar le structura de compositos organic ab le puncto de vista functional. Cata methodo essera tractate como utensil recercatorial de valor specific al chimista organic.

Le contento essera: Proprietates de phase de parve moleculas, H. F. Herbrandson e F. C. Nachod; proprietates equilibric e dynamic de grande moleculas, P. Johnson; rotation optic, W. Klyne; absorption de lumine visibile e ultraviolette, E. A. Braude; absorption de lumine infrarubie, R. C. Gore; spectros Raman, F. F. Cleveland; susceptibilitate magnetic, C. A. Hutchison; films superficial, E. Stenhagen; momentos dipolic, L. E. Sutton; diffraction electronic, J. Karle e I. L. Karle; diffraction de radiation X, J. M. Robertson; spectros microundic, E. B. Wilson, Jr., e D. R. Lide, Jr.; proprietates thermodynamic, J. G. Aston; constantes de dissociation, H. C. Brown; kinetica de reaction, E. A. Braude e L. M. Jackman; theoria de mechanica undic, C. A. Coulson; indice de autores; indice de materias.

Internal Rotation. Per S. Mizushima. Academic Press, Inc., supra-date adresse. Septembre 1954.

SOCIETATE DEL SPECTROSCOPISTAS MOLECULAR

Nove membros de iste societate es:

1(5-III-54). Forrest F. Cleveland, Instituto Technologic de Illinois, Chicago 16, Illinois, Statos Unite.

2(7-IV-54). Ann Palm, Cassa Postal 58, Instituto Technologic de Illinois, Chicago, Illinois, Statos Unite.

3(14-IV-54). Pasquale Porcelli, Universitate De Paul, Chicago, Illinois, S. U.

4(14-IV-54). S. Mrozowski, Universitate Buffalo, Buffalo 14, New York, S. U.

5(16-IV-54). Jerome M. Dowling, 2505 Haymond Street, River Grove, Illinois, Statos Unite.

6(20-IV-54). Fred L. Voelz, Cassa Postal 58, Instituto Technologic de Illinois, Chicago 16, Illinois, Statos Unite.

Altere spectroscopistas qui desira devenir membros debe scriber a:

Le Redactor, Spectroscopia Molecular
Cassa Postal 58
Instituto Technologic de Illinois
Chicago 16, Illinois, Statos Unite.

Publication del libro super moleculas polyatomic per Wilson (E. B., Jr.), Cross, e Decius es promittite per McGraw-Hill Book Company pro januario 1955.

The Bulletin. Anderson Physical Laboratory, Vol. 5, No. 2, 1954. Gratis.

Iste numero contine plure breve especias in re spectros infrarubie.

CONTRIBUTIONES FINANCIARI ADDITIONAL

Numero de contributiones durante le mense passate 10

Distribution: 500 exemplares a 26 paises.

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Contributiones usque nunc per lector per anno $1.02

Numero de exemplares del monographia, "Regulas de Selection pro Spectros Vibrational de Moleculas Polyatomic" vendite usque nunc 56

Presente numero de membros del Societate Del Spectroscopistas Molecular. . . 6

CALENDARIO DE EVENTOS SPECTROSCOPIC

Junio 14-18. 12de Symposio Annual super Spectroscopia e Structura Molecular, Universitate Ohio State. (H. H. Nielsen, Columbus 10, Ohio.)

Junio 23-25. 17me Congresso pro le Avantiamento de Methodos Spectrographic, Paris, Francia. (Secretariat, GAMS, 1, Place St. Thomas d'Aquin, Paris 7.)

Julio 1-3. Commission Juncte pro Spectroscopia, Lund, Sveda; e etiam in Lund,

Julio 1-7. Conferentia super Spectroscopia Atomic, in commemoration del nascentia de Rydberg. (P. F. A. Klinkenberg, Universitate Amsterdam, Muidergracht 4, Hollanda.)

Julio 12-23. Spectroscopia industrial moderne. Un programma designate specialmente pro chemistas e physicos ex industrias que es in le processo de installar equipamento spectrographic. (Prof. J. J. Devlin, Departimento de Physica, Collegio Boston, Chestnut Hill 67, Boston, Massachusetts, Statos Unite.

Julio 15-17. Symposio super Particulas Solide in Objectos Astronomic, Universitate Liège. (J. Duchesne, Liège, Belgica.)

Julio 19-30. Programma super spectroscopia infrarubie; instrumentation, methodos laboratorial, e solution de problemas chimic. Directores: Richard C. Lord e Foil A. Miller. (E. H. Huntress, Instituto Technologic de Massachusetts, Cambridge 39, Mass., Statos Unite.)

Augusto 30-September 3. 5te Colloquio International super Spectroscopia, Gmunden, in Austria Superior. Spectroscopia emissionic e molecular. Prof. F. X. Mayer, Chef. (J. R. Stansfield, Hilger and Watts, Ltd., 98 St. Pancras Way, London, N.W. 1, Anglaterra.)

September 3-7. Symposio International super Spectroscopia Infrarubie, Parma, Italia. Centenario de Macedonio Melloni (1798-1854). (G. Polvani, Via Saldini 50, Milano, Italia.)

-oOo-

Tetrabromoethyleno. Spectros infrarubie e Raman. F. E. Malherbe, G. Allen, e H. J. Bernstein, (National Research Council, Ottawa, Can.) Canadian Journal of Chemistry, 31, 1223-1228 (1953). Region 3 - 36 μ.

SPECTROSCOPIA MOLECULAR es redigite e publicate mensualmente in interlingua per professor Forrest F. Cleveland del Laboratorio de Spectroscopia, Instituto Technologic de Illinois, Chicago 16, Illinois, Statos Unite. Manuscriptos pro publication debe esser submittite a ille adresse.

Le texto original es legite per Dr. Alexander Gode, Chef del Division de Interlingua de Science Service (80 East 11th Street, New York 3, N. Y.). Libros importante super interlingua, disponibile ab ille adresse, es Interlingua-English Dictionary, Interlingua Grammar, e Interlingua A Prime Vista.

Labor editorial es gratis. Le costo de preparation e distribution es recipite ab le spectroscopistas, bibliothecas, e companias. Le directores de publication es senioretta Joyce Carol Broling e senior Fred L. Voelz.

. . . . . .

(Face cheques pagabile a Spectroscopia Molecular; posta al supra-date adresse)

☐ Io include $2.00 pro Spectroscopia Molecular pro 1954, e $____ additional pro le disveloppamento plus rapide de illo.

☐ Io include $2.00 pro le numeros del anno 1952 o 1953; o $4.00 pro 1952 e 1953.

☐ Io include $0.75 pro Regulas de Selection pro Spectros Vibrational de Moleculas Polyatomic; 1953, 25 paginas.

☐ Io include $____ e 500 exemplares de un pagina de information re nostre productos pro attachamento al sequente numero. (Traduction in interlingua, si desirate, gratis per Science Service.)

☐ Adde mi nomine al lista de membros del Societate Del Spectroscopistas Molecular.

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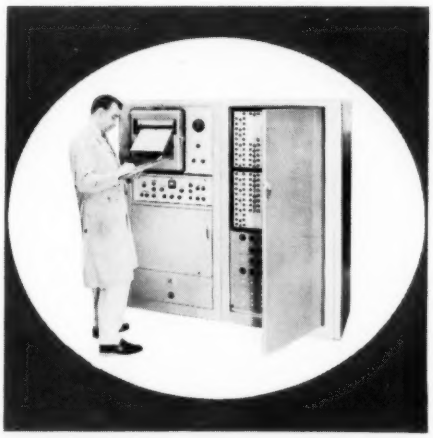

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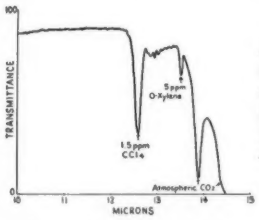

Spectrum showing trace amounts of CCl_4 and xylene demonstrates extreme sensitivity of infrared methods for analysis of atmospheric samples.

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Model 12-C Infrared Spectrometer—a tested single beam instrument for routine control applications.

Model 112 Double Pass Infrared Spectrometer—single beam, high resolving power, excellent for structural analysis. Suitable attachments for all spectral ranges. *Write for Bulletin 102.*

Model 21 Double Beam Infrared Spectrophotometer—The fastest and most efficient instrument commercially available for the recording of large numbers of spectra. Records directly in percent transmission. *Write for Bulletin 104.*

Model 13 Ratio Recording Infrared Spectrophotometer—Records double or single beam with many features of both the Model 112 and 21. Ideal for the small laboratory with a wide variety of problems. *Write for Bulletin 110.*

ACCESSORIES:

Demountable Cell—may be assembled to any thickness—for liquids, capillary films, mulls of solids—and films and powders.

Fixed Thickness Liquid Cell—for nearly all liquids and solution work. Standard thickness between 0.025 and 1 mm—others to order.

Standard Gas Cells—2, 5, 10 cm and 1 and 10 m path lengths for various absorption studies.

Microcell—obtains good spectra with 25-100 micrograms—available in thicknesses from 0.025 to 3 mm.

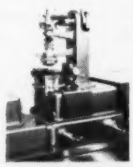
Variable Space Liquid Cell—has accurately variable path length of 0 to 5 mm to bring out features of a spectrum and to compensate for solute absorption in double beam spectrometry.

Reflectance Attachment—for specular reflectance studies of solid materials.

Pressure Cells—for liquids or gasses; path lengths from 0.025 to 50 mm, pressures up to 300 psi. Useful in trace absorption or overtone work. Long and short sizes.

Heating Stage and Heating Stage Power Supply—used with above attachment; permits heating to about 300° C. For studying polymerizations and oxidations. Cycling feature of the Model 21 automatically records reaction stages taking place.

Polarizer—for studies of crystal and molecular orientations. Rotable Cell—To assist in sample orientation for polymerization studies.



Microscope—For analysis of samples of few microns in size as single fibers, tissues, crystals, etc.

Write for Product Bulletin A-3 for more information about these accessories.